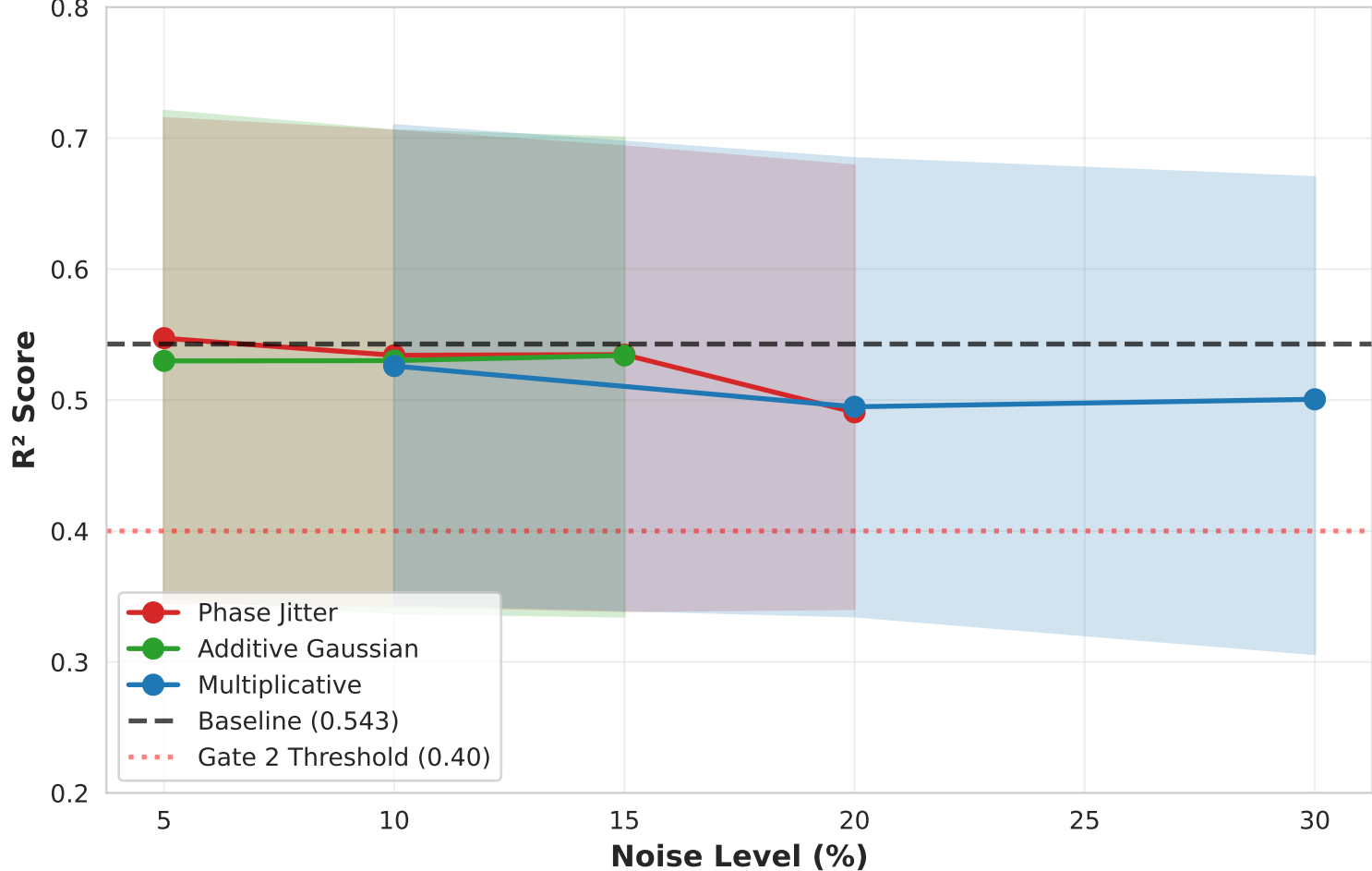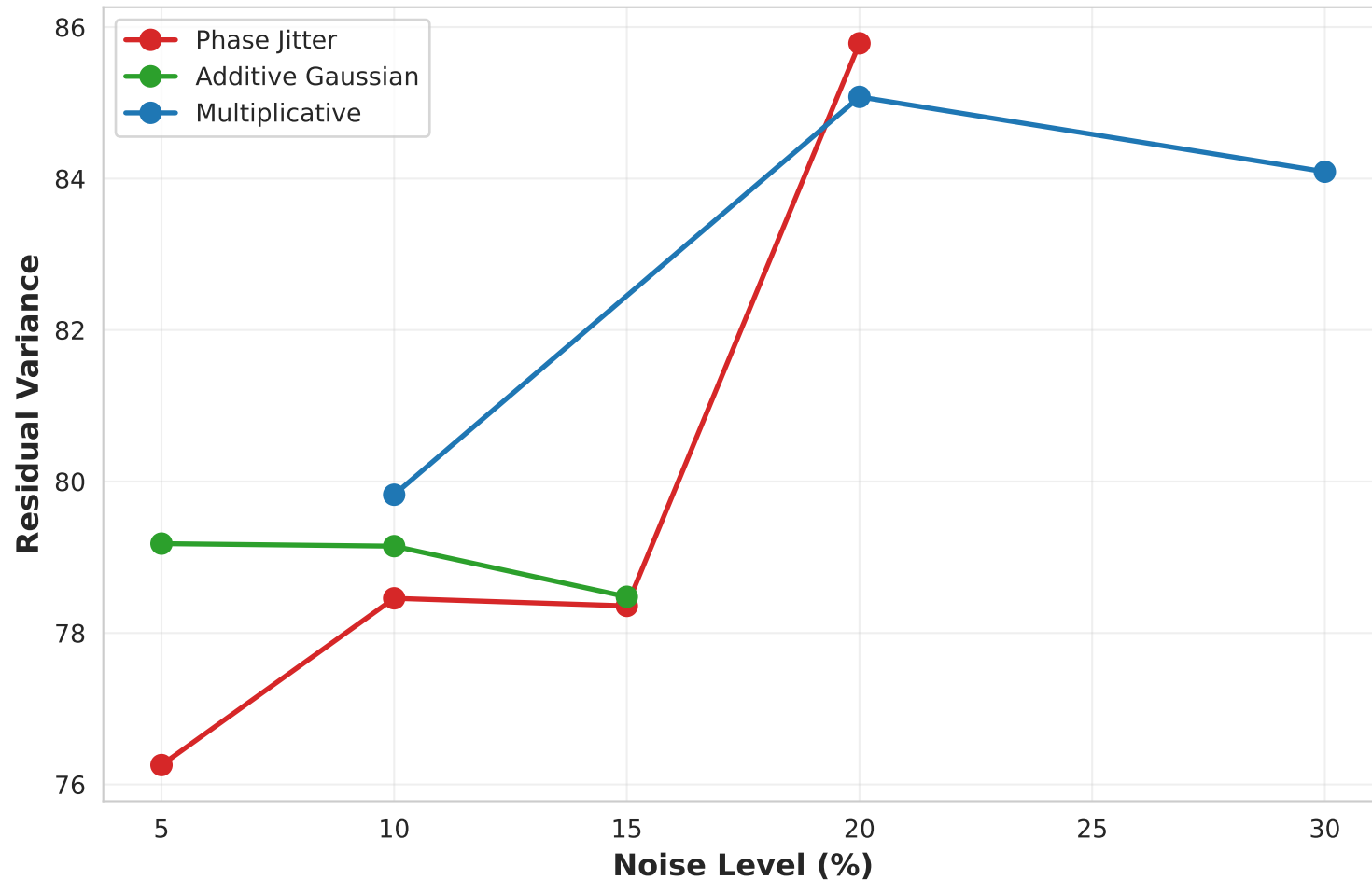# Challenge 7: Noise Injection & Robustness Analysis\nCherokee Constitutional AI Week 1 Validation
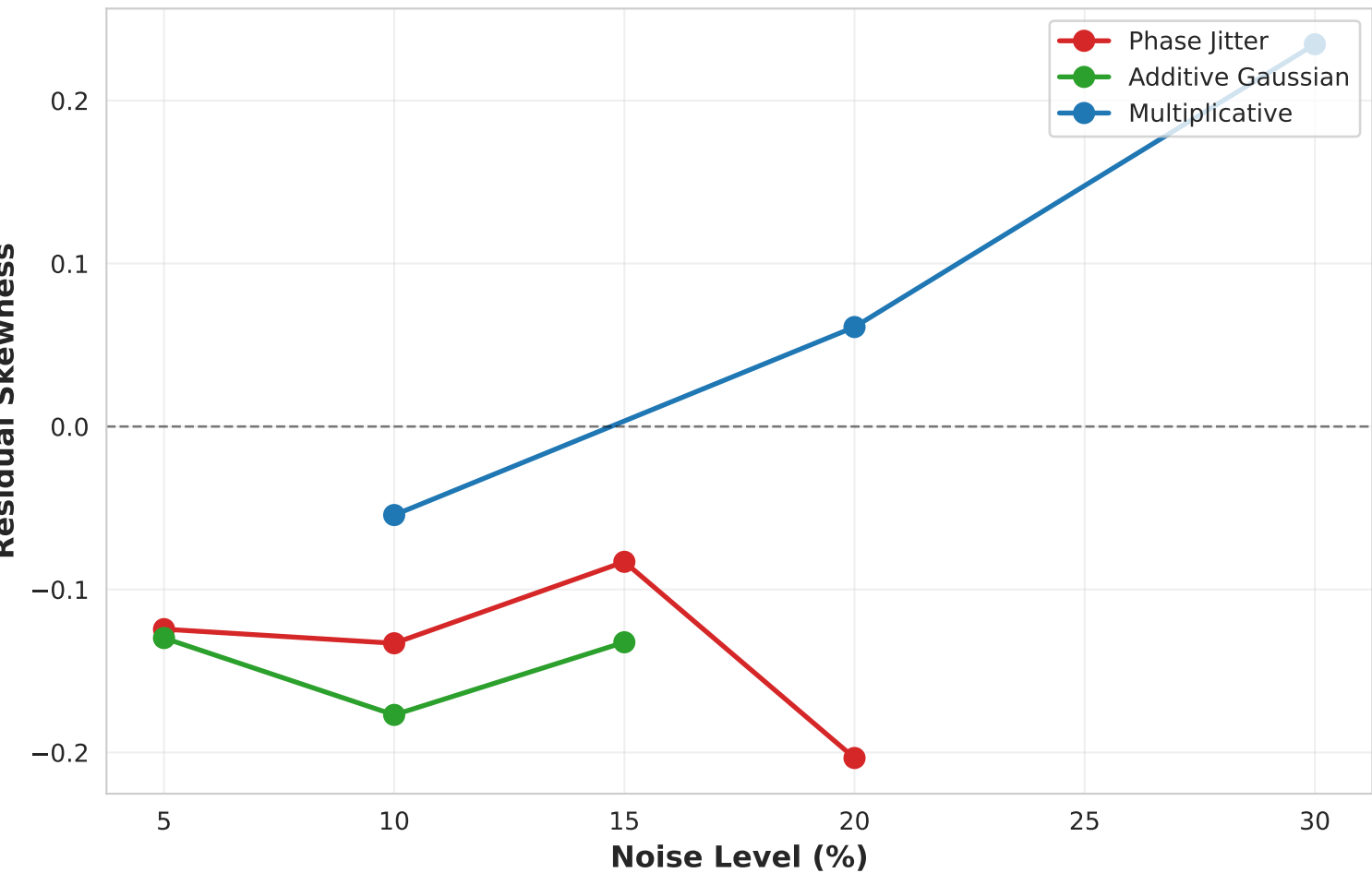
Panel 1: Robustness Across Noise Families
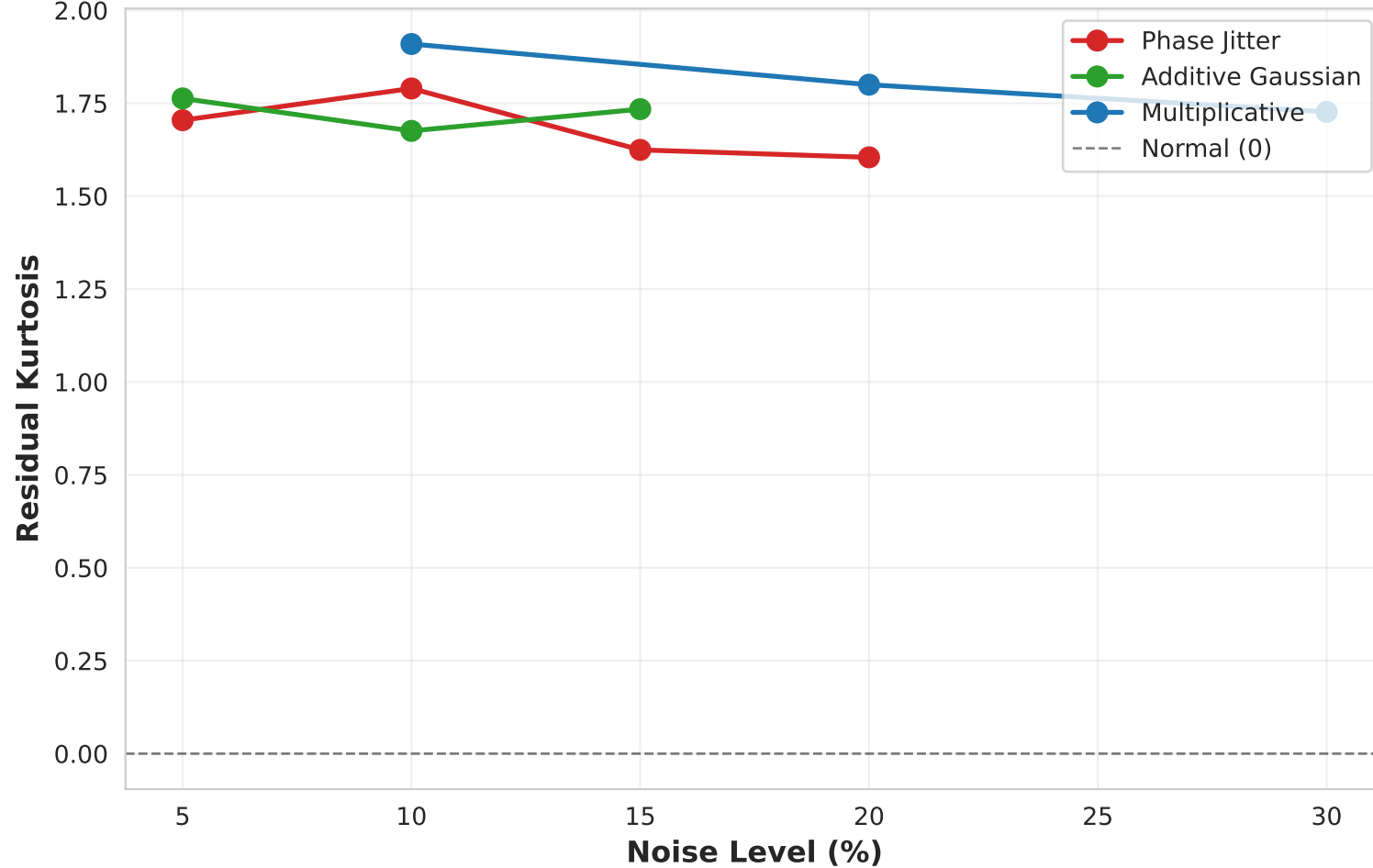**(with 95% Bootstrap Confidence Intervals)**

- Phase Jitter
- Additive Gaussian
- Multiplicative
- Baseline (0.543)
- Gate 2 Threshold (0.40)

Panel 2: Residual Variance Under Noise
(Prediction Error Spread)

- Phase Jitter
- Additive Gaussian
- Multiplicative

Panel 3: Distribution Asymmetry Under Noise
(Residual Skewness)

- Phase Jitter
- Additive Gaussian
- Multiplicative

Panel 4: Tail Behavior Under Noise
(Residual Kurtosis)

- Phase Jitter
- Additive Gaussian
- Multiplicative
- Normal (0)

Gate 2: PASS | 20% Phase Jitter: R^2 = 0.4907 (≥0.40) | Baseline R^2 = 0.5428 | 10 experiments × 500 bootstraps